



BLOOD BANKING AND TRANSFUSION

2026



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

___ In The Name of Allah ___

PREFACE

- The primary goal of this document is to enrich the training experience of postgraduate trainees by outlining the learning objectives to become independent and competent future practitioners.
- This curriculum may contain sections outlining some training regulations; however, such regulations need to be sought from the “General Bylaws of Training in Postgraduate Programs” and “Executive Policies” published by the Saudi Commission for Health Specialties (SCFHS), which can be accessed online through the official SCFHS website. In case of discrepancies in regulation statements, the one stated in the most updated bylaws and executive policies will be the reference to apply.
- Because this curriculum is subject to periodic refinement, please refer to the electronic version posted online for the most updated edition at www.scfhs.org.sa.

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We also acknowledge that the CanMEDS framework is a copyright of the Royal College of Physicians and Surgeons of Canada and that many of the descriptions' competencies have been acquired from their resources.

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INTRODUCTION

Context of Practice

Blood transfusion is a medical therapy that is crucial for many patients undergoing surgery, those with blood loss emergencies, and transfusion-dependent patients, including those with sickle cell disease or thalassemia. Despite its role as a life-saving intervention, blood transfusion can cause several infectious diseases, such as viral hepatitis, human immunodeficiency virus, and malaria. Additionally, a blood transfusion may cause various adverse events and even life-threatening complications if mistakenly administered to the wrong recipient. Therefore, it is essential that the practice of blood banking and transfusion is guided by quality standards and appropriate staff who are highly qualified with the required medical and laboratory competencies.

Blood Banking and Transfusion is a field of laboratory and clinical medicine concerned with all aspects of the safety, availability, and efficiency of blood component transfusion. The blood transfusion process starts with a donor's vein and ends with a patient's vein, and covers key activities, including blood collection, testing, preparation, storage, transportation, pre-transfusion testing, clinical indications for transfusion, infusion, post-transfusion follow-up, and management of adverse transfusion events (Allard, 2013). These laboratory and clinical activities are undertaken such that the rights of blood donors, patients, and families are respected, and scarce resources are appropriately allocated.

Blood banking and transfusion in Saudi Arabia has evolved into one of the safest and most evidence-based medical disciplines in the region. In 2023, there were approximately 274 blood banks and transfusion centers in all governmental hospitals in the Kingdom of Saudi Arabia, collecting more than 700,000 whole

blood units (Alsughayyir et al., 2022; Kingdom of Saudi Arabia Ministry of Health, 2023). With the ongoing transformation of the health sector and increasing involvement of the private health sector in health provision, the number of blood banks and transfusion centers in Saudi Arabia is expected to rise. This growth will create a greater demand for well-trained and highly qualified laboratory specialists to ensure the safety, availability, and quality of transfusion medicines across the country.

As part of its mission towards developing competent professionals, the Saudi Commission for Health Specialties (SCFHS) provides a unique training diploma program in blood banking and transfusion dedicated to medical laboratory specialist graduates. The diploma program aims to provide trainees with fundamental and in-depth knowledge of the theory and practices of blood banking and transfusion. The program centers on the core competencies outlined by the Royal College of Physicians and Surgeons of Canada (n.d.). Hence, the training rotations in this program included extensive hands-on technical sessions, mentoring, didactic lectures, and guided research opportunities.

Graduates of this program are usually qualified to become supervisors of blood banks and are therefore required to master key concepts in hematology, immunology, donor selection, blood collection, blood component processing, basic and advanced immunohematology, and continuous quality management of blood banks and transfusion laboratories.

This booklet provides clinical laboratory graduates and practitioners with information regarding applications, training, examinations, and qualifications. It also provides program directors, trainers, and training centers with information on training rotations, academic activities, and the assessment of trainees across the program.



Goals and Responsibilities of Curriculum Implementation

Ultimately, this curriculum seeks to guide trainees to become competent in their respective specialties. Accordingly, this goal requires significant effort and coordination from all stakeholders involved in postgraduate training. As “adult-learners,” trainees must be proactive, fully engaged, and exhibit the following: a careful understanding of learning objectives, self-directed learning, problem solving, an eagerness to apply learning by means of reflective practice from feedback and formative assessment, and self-awareness and willingness to ask for support when needed. The Program Director plays a vital role in ensuring the successful implementation of this curriculum. Moreover, training committee members, particularly program administrators and chief residents, significantly impacted program implementation. Trainees should be called on to share responsibility for curriculum implementation.

The strategic direction of the SCFHS applies a recognized competency model of training governance to achieve the highest quality of training, and postgraduate programs are also required to cover research and evidence-based practices in their curriculum. Additionally, academic affairs in training centers and regional supervisory training committees play major roles in training supervision and implementation. The Blood Bank and Transfusion scientific committee will guarantee that the content of this curriculum is constantly updated to match the highest standards in postgraduate education for each trainee's specialty.

What is new in this edition?

As part of the continuous improvement, there are differences between the previous and current editions of this curriculum. The current version is characterized by the following aspects:

- Transformation into a competency-based curriculum with an explicit representation of learning domains (knowledge, skills, and behavior).
- Graded responsibility for the trainee, with a clearer demarcation of what should be achieved at each stage of training (milestones).
- Better supervisory frameworks that support independent learning within a formal structure and enriched formative assessments.
- Rearranging and modifying training rotations to meet the needs and requirements of current advancements in the field of blood banking and transfusion science.
- Revision of training objectives and periods of some rotations as follows:
 - Redistribute year 1 (D1) and year 2 (D2) rotations.
 - Modify rotation titles, training durations, and goal/objectives to be comprehensive.
 - Addition of formative assessment requirements.
 - Addition of a recommended list of lecture topics.
 - Addition of suggested reading textbooks and journal articles.
 - Addition of website links to [the most relevant scientific journals](#), regulatory bodies, and scientific organizations



LIST OF ABBREVIATIONS

Abbreviation	Meaning
SCFHS	Saudi Commission for Health Specialties
BBTD	Blood Banking and Transfusion diploma
D1	(First) year of Diploma
D2	(Second) year of Diploma
RBC	Red blood cells
PC	Platelet concentrate
FFP	Fresh frozen plasma
TTD	Transfusion-transmitted disease
OSCE	Objective Structured Clinical Examination
OSPE	Objective Structured Practical Examination
Mini-CEX	Mini-Clinical Experience report
DOPS	Direct Observation of Procedural Skills report
CBD	Case-Based Discussion report
CBE	Competency-Based Education
ITER	In-Training Evaluation Report
COT	Consultation Observation Tool

Abbreviation	Meaning
RTC	Residency Training Committee
CBAHI	Saudi Central Board for Accreditation of Healthcare institutions
SFDA	Saudi Food and Drugs Authority
AABB	Association for the Advancement of Blood & Biotherapies
CAP	College of American Pathologists



PROGRAM ENTRY REQUIREMENTS

Admission and registration requirements are governed by the Executive Policies of the Saudi Commission for Health Specialties (SCFHS). Please refer to the official SCFHS website: www.scfhs.org.sa

LEARNING AND COMPETENCIES

Introduction to Learning Outcomes and Competency-Based Education

Training should be guided by well-defined "*learning objectives*" driven by targeted "*learning outcomes*" of a particular program to serve specific specialty needs (Yini Karway et al., 2024). Learning outcomes are intended to reflect the professional "*competencies*" and tasks that trainees are expected to be "*entrusted*" with upon graduation. This ensures that graduates meet the demands of the healthcare system and patient care within their specialty.

Competency-based education (CBE) is an "*adult-learning*" approach based on achieving *pre-defined, fine-grained, and well-paced* learning objectives derived from complex professional competencies (Frank et al., 2015; van der Vleuten, 2015).

Professional competencies in healthcare are often complex, integrating multiple learning domains (knowledge, skills, and attitude). CBE is expected to transform traditional postgraduate education. For instance, training time, while a valuable resource, should not be considered a proxy for *competence* (e.g., the duration of a rotation in certain hospital areas is not the primary indicator of competence achievement). Furthermore, CBE emphasizes the critical role of informed judgment in assessing a learner's competency progress, based on staged and formative assessments derived from multiple workplace-based observations.



Several CBE models have been developed for postgraduate healthcare education, including CanMEDS by the Royal College of Physicians and Surgeons of Canada (RCPSC), the CBME-Competency model by the Accreditation Council for Graduate Medical Education (ACGME), Tomorrow's Doctor in the UK, and numerous others (Chaney et al., 2021; Edgar et al., 2024). The following concepts aim to enhance the implementation of CBE in this curriculum:

- **Competency:** Competency is a cognitive construct assessing the potential to perform efficiently in each situation based on professional standards. Professional roles (e.g., medical expert, health advocate, communicator, leader, scholar, collaborator, and professional) are used to define competency-roles, making them amenable to learning and assessment.
- **Milestones:** Milestones represent stages along the developmental journey within the competency continuum. Throughout their learning journey, from junior to senior levels, trainees will be guided to transition from novice/supervised practitioners to master/unsupervised practitioners. This does not diminish the role of supervisory/regulatory bodies in addressing malpractice by independent practitioners. Milestones are expected to enhance the learning process by pacing training and assessment to match trainees' developmental levels (junior vs. senior).
- **Learning Domains:** Whenever possible, efforts should be directed toward annotating learning outcomes with their corresponding domain (K=Knowledge, S=Skills, and A=Attitude). A given learning outcome may have more than one annotation.
- **Content-Area Categorization:** It is advisable to categorize learning outcomes into broad content areas related to professional practice. For example, diagnostic versus therapeutic, simple versus complex, urgent versus chronic, and so on.

Trainees are expected to progress from novice to mastery level in a defined set of professional competencies. SCFHS has endorsed CanMEDS to articulate professional competencies. This curriculum applies the principles of the CanMEDS competency-based medical education, which represents a globally accepted framework outlining competency roles.

Program Duration

The Blood Banking and Transfusion Diploma program is a 2-year, full-time program.

Program Rotations

During the training period, candidates are expected to rotate through different sections and units within the blood bank and transfusion service laboratory. Program rotations can be conducted at any approved training center, whether a hospital blood bank or a central blood bank. The exact start and end dates for each rotation are determined annually by the program's scientific committee and communicated to all program directors, trainers, and trainees at the beginning of each training year. Table 1 below shows the rotations for each academic year and their duration in weeks.

Table 1: List of the program rotations and their durations

Training Year	Mandatory core rotations*		
	Rotation name	Duration	Setting
D1	• Orientation	2 weeks	• Training center
	• Blood Donor Management	8 weeks	• Blood donation center ¹
	• Apheresis Procedures	6 weeks	• Blood donation center • Clinical areas
	• Blood Components Processing	8 weeks	• Component processing laboratory
	• Immunohematology	16 weeks	• Blood bank ² and transfusion laboratory
	• Transfusion-transmitted diseases (TTDs)	8 weeks	• Blood bank and transfusion laboratory ³
	• Annual holiday	4 weeks	**To be arranged with the program director**
D2	• Special Transfusion Preparation and Practice	10 weeks	• Blood bank and transfusion laboratory
	• Organization and Management of Transfusion Services	8 weeks	• Blood bank and transfusion laboratory
	• Continuous Quality Management	8 weeks	• Blood bank and transfusion laboratory
	• Research	14 weeks	• Training center

Training Year	Mandatory core rotations*		
	Rotation name	Duration	Setting
	Annual holiday	4 weeks	**To be arranged with the program director**
	Elective rotation**		
	Rotation name	Duration	Setting
	Elective Rotation	8 weeks	Blood bank and transfusion laboratory

(***Mandatory Core Rotation:** A set of rotations that represent a program's core components and are mandatory to complete.

****Elective Rotation:** A set of rotations related to a specialty, as determined by the scientific council/committee, that the trainee is required to complete.

¹ **Blood Donation Center:** A facility dedicated primarily to the recruitment, assessment, and care of blood donors and the collection of blood or blood components through whole-blood donation or apheresis.

² **Blood Bank:** A hospital unit that stores, issues, and may perform compatibility tests on blood and blood components exclusively for use within hospital facilities, including hospital- based transfusion activities. Some hospital-based blood services may also engage in blood collection, processing, and donation testing activities, thereby functioning as blood establishments.

³ **Transfusion Laboratory:** A specialized clinical laboratory primarily responsible for **pre-transfusion testing and immunohematology investigations** to ensure safe and compatible transfusions. Its functions include ABO and RhD typing, antibody screening and identification, compatibility testing, investigation of serologic discrepancies, selection of suitable blood components, and laboratory investigation of suspected transfusion reactions.

Mapping of Learning Objectives and Competency Roles to Program Rotations

First year (D1) rotations

The first year is designed to provide training in blood donor management and apheresis procedures, alongside rotations in blood components testing and processing, and immunohematology. The overall goals for the first year are to:

- Equip the trainee with the knowledge, skills, and attitudes necessary for proper donor selection, blood collection, donor testing, blood component processing, and immunohematology testing for both donors and patients.
- Prepare trainees to collaborate with clinicians in implementing proper blood transfusion guidelines.
- Develop professional communication skills.
- Master all technical procedures in blood donor management, apheresis procedures, donor testing for transfusion-transmitted diseases (TTDs), blood component processing, and basic and advanced immunohematology testing methods.

The first year of the program comprises the following rotations

1. Orientation (2 weeks)
2. Blood Donation Management (8 weeks)
3. Apheresis (6 weeks)
4. Blood Components (8 weeks)
5. Immunohematology (16 weeks)
6. Transfusion-Transmitted Infections (TTIs) (8 weeks)

Orientation Rotation:

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Training center	Junior	1	2 weeks	- Outline the structure, key modules, and expected competencies of the blood bank and transfusion diploma training program. - Describe the available learning modalities (e.g., e-learning, hands-on) and locate core training resources. - Summarize the SCFHS training policies and identify how to retrieve them as needed. - Describe the setting in the training center, including attending center-specific training. - Apply key safety protocols to ensure safe work practices in routine activities. - Describe the use of IT systems in blood bank and transfusion services and describe their role in donor management, inventory control, or patient safety.	Professional Expert



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Communicate effectively with relevant organizations and parties in the training center using appropriate professional terminology. - Demonstrate appropriate verbal and non-verbal communication in professional settings.	Communicator
				- Identify the roles and responsibilities of team members within the training center. - Demonstrate awareness of interdepartmental interactions and workflows.	Collaborator
				- Demonstrate professional responsibility, including punctuality, attendance, and task completion. - Follow organizational workflows and reporting structures. - Demonstrate awareness of time management and task prioritization in daily activities.	Leader

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				Use institutional resources responsibly and efficiently.	
				- Recognize the importance of safety, quality, and risk management within the training environment. - Demonstrate awareness of the training center's role in supporting individual and public well-being.	Health Advocate
				- Demonstrate a commitment to learning and self-improvement. - Use policies, procedures, and guidelines as learning and practice references.	Scholar
				- Explain core ethical principles and professional responsibilities specific to the training program. - Comply with institutional rules, codes of conduct, regulatory, occupational health, safety, and infection control requirements.	Professional

Blood Donor Management Rotation:

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Blood donation center	Junior	1	8 weeks	• Demonstrate proficiency in blood donor management and strategies to achieve 100% voluntary donation. • Design and implement outdoor blood donation campaigns. • Identify donor selection and eligibility criteria for allogeneic blood donation. • Explain eligibility requirements for autologous blood donation. • Analyze the donor health questionnaire (DHQ), including its structure, content, update process, and review procedures. • Apply donor deferral criteria related to medications, surgeries, travel, chronic conditions, vaccinations, infectious diseases, and general health. • Interpret donation intervals and recognize exceptions requiring blood bank director decisions. • Develop donor education strategies and methods for recruitment,	Professional Expert

Rotation Setting	Training stage	Train ing years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				motivation, retention, and satisfaction measurement. • Evaluate psychological and social factors influencing volunteer motivation to donate blood. • Plan and manage blood inventory logistics for geographic regions or hospitals, including daily, weekly, and monthly collection targets. • Interact professionally and empathetically with prospective donors. • Conduct donor screenings and categorize donor eligibility status: eligible, temporarily deferred, indefinitely deferred, or permanently deferred. • Perform and assess donor physical exams (vital signs and weight) using acceptance/rejection criteria. • Describe the confidential unit exclusion procedure and protocols for handling third-party information.	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Summarize acceptance criteria and techniques for autologous blood collection and its clinical applications. - Demonstrate competency in whole blood collection, including vein selection, venipuncture site preparation, arm disinfection, volume collection, timing, and sample handling. - Compare types of anticoagulant-preservative solutions used in whole blood collection and their benefits. - Assess the clinical relevance, advantages, and risks of directed donations. - Recognize and manage adverse reactions associated with blood donation and phlebotomy. - List and explain laboratory tests required for donor blood samples. Prepare a donation program and address factors that affect motivation to donate blood voluntarily. - Prepare effective blood donation campaign programs.	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Describe the functions of the donor information system. - Conduct the donor registration process and present pre-donation information to donors. - Perform donor interviews and complete the DHQ form. - Conduct donor physical examinations. - Determine if the donor is eligible to donate or is temporarily, indefinitely, or permanently deferred. - Describe the clinical relevance of directed donation. - Explain the process and indications for therapeutic phlebotomy. - Perform the phlebotomy process, including ID identification, labeling, venipuncture, arm disinfection, sample collection, monitoring donors, and DHQ documentation. - Counsel donors about the benefits and risks of donating blood products.	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Explain the rationale and process of donor self-exclusion and obtain donor consent. • Recognize and appropriately manage adverse events related to blood donation. • Describe the process of donor notification, counseling, and follow-up as appropriate.	
				• Develop rapport, trust, and professional relationships with other physicians, allied healthcare workers, donors, patients, and families (as required). • Accurately elicit and synthesize relevant information and perspectives from blood donors and their families and friends. • Accurately convey relevant information and explanations about blood donation to prospective donors. • Speak in public and present to diverse audiences using clear language appropriate for their level.	Communicat or

Rotation Setting	Training stage	Train ing years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Respect team ethics and confidentiality. - Engage in team meetings with other workers when requested. - Minimize misunderstanding and maximize team functions to best utilize interpersonal interactions for donor care.	<i>Collaborator</i>
				- Serve in administrative and leadership roles, as appropriate. - Work effectively and efficiently in mobile campaigns. - Participate in activities that contribute to the effectiveness of blood donation organizations and systems. - Manage practice and career effectively.	<i>Leader</i>
				- Recognize and emphasize to the public and medical profession the essential contributions and benefits of blood donation. - Participate in various types of voluntary work in nonprofit organizations to promote and educate	<i>Health Advocate</i>



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				the community about the importance of blood donation. - Promote the health of individual donors, communities, and populations. - Use knowledge, skills, and expertise to advance health and blood donation within the community.	
				- Maintain and enhance professional activities through ongoing learning. - Develop and implement a personal continuing education strategy. - Contribute to the development of new knowledge through research and literature reviews, as necessary.	Scholar
				- Adhere to codes of ethics at all times. - Deliver the highest quality of care with integrity, honesty, and compassion. - Respect the health and well-being of individuals and society through ethical practice and professionalism.	Professional

Apheresis Procedures Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Blood donation Center Clinical areas	Junior	1	6 weeks	- Describe the eligibility requirements for apheresis donations. - Discuss donor health questionnaire (DHQ) requirements for apheresis donations. - Describe donor selection and monitoring for apheresis donations. - Describe donor deferral requirements, particularly for apheresis donations and medication-related deferrals. - Describe donation intervals and exceptions for apheresis donation (single vs. double units). - Define "apheresis" and describe the physiology of the process. - Define leukapheresis, plateletpheresis, plasmapheresis, and erythrocytapheresis. - Describe the instruments and systems used for donor apheresis collection. - Describe the principles of apheresis technology, including centrifugation, filtration, and immunoadsorption. - Describe types of anticoagulant-preservative solutions for apheresis collection and their benefits.	Professional Expert



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- List the different types of components that can be collected by apheresis technology. - Demonstrate proficiency in selecting apheresis machines and blood donors, and in obtaining apheresis products that meet quality standards. - List the indications for therapeutic apheresis use. - Recognize and manage reactions associated with apheresis donations and therapeutic apheresis. - Identify different laboratory tests that should be conducted on apheresis donors/patients prior to commencing the procedure. - Summarize the indications for therapeutic apheresis and the appropriate replacement fluids for use in various situations. - Organize emergent or scheduled therapeutic apheresis procedures through conversations and written consultant notes. - Describe the principles of hematopoietic stem cell transplantation, including	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				collection, processing, and storage of stem cell products, and indications for use. • Demonstrate proficiency in evaluating and preparing patients for therapeutic apheresis, including discussing the risks and benefits associated with apheresis procedures with the patient. • Operate apheresis machines and perform apheresis collections independently. • Perform phlebotomy, ID identification, labeling, venipuncture, arm disinfection, sample collection, donor monitoring, collection documentation, and medication administration. • Request, perform, and interpret indicated laboratory tests on donated apheresis blood products. • Recognize and appropriately manage adverse events related to apheresis donation of various blood products. • Interact appropriately with patients and machines, plan therapeutic plasma exchange (TPE), select replacement fluids, and monitor patients.	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Perform common procedures for peripheral blood stem cell collection (PBSC), processing, and cellular product therapies (optional). - Collect, process, store, and thaw PBSC (optional). - Prepare a program for successful recruitment of apheresis donors. - Recognize and appropriately manage adverse events related to apheresis procedures.	
				- Communicate effectively with medical colleagues, nursing staff, and technical staff, both verbally and in written reports. - Convey effective oral and written information regarding apheresis procedures, and issue comprehensive, clear, concise, accurate, and timely apheresis reports that include all data relevant to patient management and further diagnostic work-up. - Clearly explain various procedures, such as platelet apheresis, including advantages and disadvantages, to patients and their relatives.	Communicator

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Manage time to maximize educational resources and opportunities. • Develop general ideas on how to effectively allocate finite healthcare and health education resources to optimize donor care and lifelong learning. • Participate in activities that contribute to the effectiveness of the organization's healthcare system.	Leader
				• Follow all safety precautions in the blood bank facility and strive to implement and follow all rules and regulations at all times. • Recognize and reinforce, to both the public and the medical profession, the essential contribution of laboratory medicine to health.	Health Advocate
				• Participate in rounds, conferences, and teaching sessions. • Maintain and enhance professional activities through ongoing learning. • Contribute to the creation, dissemination, application, and translation of new medical knowledge and practices.	Scholar



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Deliver the highest quality of care with integrity, honesty, and compassion. • Act professionally towards patients, donors, and colleagues alike. • Respond quickly to urgent requests and night calls.	Professional

Blood Component Processing Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Component Processing Lab	Junior	1	8 weeks	- Evaluate the factors influencing the quality of blood bags for whole blood and apheresis collection. - Compare and contrast the characteristics of anticoagulant-preservative solutions for blood products. - Summarize the steps in blood component processing and preparation using different methods, such as Platelet-Rich Plasma (PRP) and Buffy Coat (BC). - Explain the rationale behind leukocyte-reduction techniques. - Measure the volume requirements for blood collection and apheresis donation according to standards (AABB and CBAHI). - Identify the instruments and systems used for blood component processing and preparation. - Explain the various factors affecting the quality of blood components. - Explain the principle of pathogen reduction technology (PRT), including preparation and product treatment.	Professional Expert



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Apply strategies for uniform product labeling (e.g., ISBT128 labeling system) and product label verification using donor information systems. • Explain the reasons that may require unit quarantine, describe the process, and detail the review of donation and testing records. • Examine the significance of appropriate storage temperatures for blood components, including their shelf-life. • Demonstrate proficiency in the compatibility and labeling requirements of various components. • Discuss the methods of preparing components that require pooling and thawing processes. • Demonstrate proficiency in maintaining the quality of blood components as per standards set by various agencies (AABB, CBAHI, SFDA). • Explain the process of plasma fractionation and summarize critical steps in preparation, such as pooling and viral inactivation. • Apply the transportation requirements for blood and blood component products.	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Prepare various blood components, such as Packed Red Blood Cells (PRBC), Fresh Frozen Plasma (FFP), Platelet Concentrate (PLTC), and Cryoprecipitate (CRYO). • Prepare blood components by thawing and pooling. • Evaluate the storage conditions of various blood and blood components. • Assess quality control metrics for blood and blood components. • Apply proper labeling of various products using ISBT 128. • Trace the transportation and shipping of blood and blood components. • Prepare, process, store, release, and measure the quality control for main blood components. • Organize the processing, manufacturing, and storage of safe blood components. • Recognize plasma derivatives that are prepared commercially. • Explain the metabolic changes that may occur during storage.	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Plan the need for effective, timely, clear, and accurate communication with colleagues. - Classify various types of communication (verbal, written, other) and apply them appropriately. - Discuss issues in multidisciplinary team meetings and demonstrate continuous education for physicians and other team members.	Communicator
				- Seek appropriate consultation from other health professionals, recognizing the limits of their expertise. - Work effectively within a team. - Provide the necessary time and effort when required by others for patient care.	Collaborator
				- Become familiar with the quality control procedures in preparation of blood components. - Collaborate effectively with other organizations. - Make decisions regarding acceptable versus unnecessary requests for blood components. - Prioritize urgent cases in a timely fashion.	Leader

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Identify areas for improvement, promotion, and advocacy. - Respond to individual patients' health needs and issues as part of patient care.	Health Advocate
				- Demonstrate the ability to mentor others and share learned information (healthcare and non- healthcare personnel), each at their level of understanding. - Be capable of self-directed study using appropriate texts and information sources. - Recognize personal gaps in knowledge and how to address them. - Critically evaluate information and its sources and apply this appropriately to practice decisions.	Scholar
				- Practice commitment to the best quality of care. - Identify and appropriately respond to ethical issues. - Respect patients' rights and confidentiality.	Professional



Immunohematology Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Blood Bank and Transfusion Laboratory	Junior	1	16 weeks	• Explain the nature of human immunity and the elements of the human immune system. • Describe the basic principles of antigens, antibodies, and complement. • Demonstrate complement activation pathways and their role in transfusion medicine. • Explain the development of antibodies after immunization and infection. • Explain the principles of antigen/antibody reactions and factors affecting these reactions. • Identify antigens of different formed elements of blood, such as red cells, platelets, and leukocytes, and explain their implications in transfusion medicine. • Demonstrate the blood group system, including its conditions, and describe the different types of blood group antigens (e.g., polymorphic antigens, low/high prevalence antigens). • Describe the principles of structural and functional evaluation of B cells, T cells, and NK cells.	Professional Expert

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Describe the principles of classifying primary immunodeficiency diseases, including defects in humoral and cellular immunity. - Discuss the principles of basic genetics regarding Mendelian laws of inheritance, phenotype/genotype, and population genetics. - Explain the nomenclature, organization, and polymorphism of the human major histocompatibility complex, including HLA class I, II, and III genes. - Discuss the role of HLA typing in organ and bone marrow/stem cell transplantation and explain how HLA antigen mismatch results in allogeneic reactions in recipients. - Demonstrate HLA typing techniques, including serological methods, microcytotoxicity assays, nucleic acid assays, and lymphocyte culture techniques (Optional). - Apply knowledge of the principles of patient/unit identification and pretransfusion testing, including ABO/Rh	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				testing, RBC antibody screening, and antibody identification. • Compare and contrast conventional crossmatching versus type and screen using various advanced technologies, such as gel, solid phase, and column agglutination. • Identify clinically significant RBC antibodies from an antibody panel, including multiple alloantibodies and mixtures of alloantibodies and autoantibodies. • Determine the level of difficulty in obtaining blood for such patients and effectively communicate these results to clinicians. • Summarize the general principles and clinical utility of blood group genotyping. • Demonstrate the general principles and clinical utility of prenatal and postnatal testing. • Describe the general principles and clinical relevance of maternal alloimmunization. • Demonstrate a working knowledge of the principles of hemostasis and coagulation	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				and proficiency in the initial treatment of patients with bleeding disorders. • Evaluate patients refractory to platelet transfusions. • Summarize the principles of histocompatibility testing and platelet crossmatching and apply this knowledge to the selection of appropriate platelet products when indicated. • Apply ABO/Rh testing and pre-transfusion testing of patient/donor, including antibody screening and antibody identification. • Distinguish cases of different ABO discrepancies (i.e., subgroups of A or B, acquired B phenotype, and so on) and resolve inconsistencies. • Differentiate Rh discrepancy cases and apply the weak-D test method. • Apply advanced testing for antibody identification. • Calculate antibody titration. • Complete routine and extended RBC antigen phenotyping. • Differentiate alloantibody and autoantibody cases.	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Demonstrate elution and adsorption techniques. • Apply the direct antiglobulin (Coombs) test. • Prepare testing to identify rare blood group antigens. • Examine serologic crossmatch testing, including immediate-spin, type and screen, and complete crossmatch (indirect-antiglobulin test). • Apply advanced immunohematology testing to diagnose and evaluate autoimmune hemolytic anemias. • Explain histocompatibility testing and platelet crossmatching (Optional). • Perform HLA typing techniques, including serological methods, microcytotoxicity assays, nucleic acid assays, and lymphocyte culture techniques (Optional). • Discuss antenatal and postnatal immunohematology testing (e.g., fetal-maternal screening, Kleihauer–Betke Test, and RhIgG dose calculations).	
				• Communicate effectively with different levels of clinical and technical colleagues, including technicians, technologists, supervisors, clinical scientists, and	Communicator

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				consultants, both verbally and in written reports. Develop rapport, trust, and professional relationships with other sections, departments, and allied healthcare workers.	
				- Work effectively with other health professionals to diagnose, prevent, and resolve any transfusion case, blood group, and antibody problems. - Serve in administrative and leadership roles, as appropriate.	Collaborator
				- Manage time to maximize educational resources and opportunities. - Acquire general knowledge on how to allocate finite healthcare resources appropriately.	Leader
				Explain and follow all safety precautions in the laboratory facility and strive to implement and follow all rules and regulations at all times.	Health Advocate
				- Contribute to the growth of medical and technical knowledge through research. - Participate in rounds, conferences, and teaching sessions.	Scholar



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Practice ongoing professional development and assess progress toward excellence. - Apply quality standards of care with integrity, honesty, and compassion. - Practice laboratory medicine in an ethical manner and with a sensitivity to diversity of patient results, with confidentiality and integrity.	Professional

Transfusion-Transmitted Infections Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Blood Bank	Junior	1	8 weeks	- Describe the typical time course of appearance and disappearance of serum antigens and antibodies used in screening for major transfusion-transmitted infections, including HIV, hepatitis B, hepatitis C, cytomegalovirus, bacterial/fungal/protozoal infections, and syphilis. - Describe and interpret non-treponemal and treponemal antibody tests used to screen donors for syphilis. - Compare and contrast various methodologies, such as ELISA, rapid tests, and chemiluminescence, used in screening for transfusion-transmitted infections. - Describe the benefits and principles of Nucleic Acid Testing (NAT) in blood transfusion services. - Identify available options for blood banks to reduce the risk of bacterial transmission through platelets, including available technologies for	Professional Expert



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				bacterial testing and pathogen inactivation. - Describe the investigation process for suspected cases of transfusion-related bacterial sepsis. - Describe the indications and techniques of confirmatory tests. - Explain the importance of sensitivity, specificity, evaluation, and validation of testing assays. - Describe the role of the blood bank in managing blood donors with reactive results for transfusion-transmitted infections, according to Saudi Arabian regulations. - Perform various methodologies, such as ELISA, chemiluminescence, and other assays, used in screening for transfusion-transmitted infections. - Perform NAT and interpret the results. - Perform bacterial testing for platelets. - Perform quality control for various assays. - Perform various laboratory tests, such as Western blot and neutralization, used in the confirmation of transfusion-	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				transmitted infections, and interpret the results. Evaluate and validate different testing assays.	
				- Define the role of the blood bank in communicating with donors who have reactive screening results and outline the scope of practice for physicians and technologists in this matter. - Describe factors that may influence effective communication.	Communicator
				- Participate in meetings, conferences, and case presentations. - Communicate with blood bank physicians to report critical results.	Collaborator
				Utilize time and resources effectively to balance job tasks, budget restrictions, professional expectations, and personal life.	Leader
				Participate in various types of voluntary work in nonprofit organizations, such as International HIV Day, to promote and educate the community about the importance of screening and early detection of AIDS.	Health Advocate



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				Explain and follow all safety precautions in the blood bank facility and strive to implement and follow all rules and regulations at all times.	
				- Contribute to the development of new knowledge through research. - Participate in rounds, conferences, and teaching sessions. - Maintain and enhance professional activities through ongoing learning.	Scholar
				- Deliver the highest quality of care with integrity, honesty, and compassion. - Practice transfusion in an ethical manner and respect confidentiality.	Professional

Second year (D2) rotations

During the second year of training, the trainee is expected to develop a broad knowledge of transfusion medicine practice, including the management of transfusion requirements in special patient populations, the recognition and management of adverse transfusion events, the organization and management of transfusion services, and continuous quality management. Trainees will also have the opportunity to select rotations within or outside the training center. Additionally, trainees will be required to conduct scientific research and produce a research thesis.

The overall objectives for the second year of training are as follows:

- Demonstrate knowledge of transfusion in special patient populations.
- Differentiate between various types of transfusion reactions and interpret investigation results.
- Apply principles of organization and management within blood banks and transfusion services.
- Utilize quality tools and communicate results with colleagues inside and outside the blood bank and transfusion laboratory.
- Explain elements of quality management systems and accreditation requirements.
- Recognize key aspects of quality improvement, such as risk management and key performance indicators in blood transfusion.
- Participate in quality management improvement projects and plans.
- Conduct scientific research.



The second year of the program comprises the following rotations:

1. Special transfusion preparation and practice (10 weeks)
2. Organization and management of transfusion services (8 weeks)
3. Continuous quality management (8 weeks)
4. Research project (14 weeks)
5. Elective rotation (8 weeks)

Trainees are required to use the elective rotation to expand their knowledge and practice in specific areas of blood banking and transfusion services. This rotation can be selected from D1 or D2 core rotations, provided that the training time is not less than 8 weeks. All training objectives and assessment methods of the selected core rotation will apply to the elective rotation. Trainees are recommended to select rotations outside the training center whenever possible and appropriate.

Special Transfusion Preparation and Practice Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Blood Bank and Transfusion Laboratory	Senior	2	10 weeks	• Demonstrate the ability to describe and apply methods, processes, and clinical indications for modifying blood components, including thawing, irradiation, volume depletion, washing, and pooling. • Describe the clinical indications for various blood components and appropriately select them for adult and neonatal transfusions. • Describe the indications and methods for freezing and deglycerolizing RBCs • Describe the indications and methods for pathogen inactivation of blood components. • Describe the preparation process (through fractionation) and clinical indications for various plasma derivatives. • Describe the recognition process (signs and symptoms) of different transfusion adverse reactions and demonstrate knowledge of risk factors, pathophysiology, investigations,	Professional Expert



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				laboratory testing, and preventive strategies. • Describe hemostatic and thrombotic disorders related to blood transfusion medicine. • Describe the physiology of hemostasis, focusing on the roles of platelets, coagulation pathways, and fibrinolysis. • Describe the general principles and clinical utility of platelet function testing. • Describe the clinical utility of coagulation and thrombosis testing. • Describe the general principles of screening coagulation tests (e.g., prothrombin time, activated partial thromboplastin time, fibrinogen, and thrombin time). • Describe the pathophysiology and laboratory diagnosis of disseminated intravascular coagulation. • Describe the principles of massive hemorrhage management and the use and activation of massive transfusion protocols.	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Describe the principles of the emergency transfusion process. - Describe the pathophysiology, laboratory diagnosis, and transfusion of autoimmune hemolytic anemia (AIHA). - Describe the utility of blood substitutes and hematopoietic agents. - Describe the principles of patient blood management. - Prepare and select appropriate blood components for routine transfusion and for patients with special modification needs: - Thawing - Pooling - Irradiation - Cell washing - volume depletion - whole blood reconstitution - red blood cell freezing (Optional) - Investigate cases of DIC. - Prepare blood components for emergency and massive transfusions. - Investigate and report findings of transfusion adverse reactions.	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				Perform coagulation tests and thrombosis screening (e.g., prothrombin time, activated partial thromboplastin time, fibrinogen, and thrombin time).	
				- Communicate effectively with clinical and technical colleagues at all levels, including technicians, technologists, supervisors, and consultants, both verbally and in written reports. - Communicate effectively with physicians to assist them in selecting appropriate blood types. - Develop rapport, trust, and professional relationships with other sections, departments, and allied healthcare workers.	Communicator
				- Contribute effectively to interdisciplinary team activities by participating in regular hospital transfusion committee meetings. - Work effectively with other healthcare professionals, including nurses, consultants, and laboratory professionals.	Collaborator
				Use laboratory and institutional resources appropriately.	Leader

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				Allocate finite healthcare resources wisely.	
				Explain and follow all safety precautions in the blood bank facility, striving to always implement and adhere to all rules and regulations.	Health Advocate
				- Practice independent lifelong learning to stay up-to-date in all aspects of transfusion medicine through reading, using electronic resources, and attending symposiums and conferences. - Assist others in learning and improving knowledge.	Scholar
				- Deliver care of the highest quality with integrity, honesty, and compassion. - Demonstrate the maturity and responsibility expected of all professionals. - Exhibit appropriate personal and interpersonal professional behavior. - Respond quickly to urgent requests and night calls.	Professional



Organization and Management of Transfusion Services

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Blood Bank and Transfusion Laboratory	Senior	2	8 weeks	- Describe various management and organizational models for blood banks and transfusion laboratories. - Describe the principles of human resources management and workload assessment in blood banks and transfusion laboratories. - Describe how Standard Operating Procedures (SOPs) are used, developed, authored, and reviewed, and their importance in mandatory laboratory inspections by various accrediting agencies. - Describe various methods for conducting blood utilization reviews. - Explain the logistics required to determine an appropriate blood inventory for a geographic region and the process of meeting daily, weekly, and monthly collection targets. - Describe the fundamental concepts of medical statistics. - Describe the process of screening and triaging requests for blood components during inventory shortages.	Professional Expert

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Describe the process for blood utilization reviews. - Explain the major regulations and guidelines applicable to the collection, processing, storage, and release of blood and other cellular therapeutic products. - Describe how to develop new policies and procedures or modify existing ones based on literature reviews or new guidelines issued by regulatory agencies. - Outline the necessary steps in donor notification and counseling associated with positive infectious disease testing results, and the donor look-back process. - Describe competence in managing blood inventory and the ability to effectively communicate hospital needs to the blood supplier. - Explain the process of hospital transfusion/blood usage committee meetings. - Describe the principles and applications of a Hemovigilance program. - Describe the key steps in investigating post-transfusion infections.	



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Describe the blood bank internal disaster plan. - Prepare a staffing plan and rotation schedules for blood banks and transfusion laboratories. - Prepare new policies and procedures and/or update existing policies and procedures based on literature reviews and/or newly published guidelines. - Conduct and report blood utilization reviews. - Determine and monitor appropriate blood inventories for various geographic regions, hospital capacities, and historical utilization scenarios. - Interpret various blood bank statistics and performance reports. - Screen and triage requests for blood components during inventory shortages. - Interpret major regulations and guidelines applicable to the collection, processing, storage, and release of blood and other cellular therapeutic products. - Perform data gathering in cases of donor look-back processes.	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Demonstrate competence in managing blood inventory and the ability to effectively communicate the hospital's needs to the blood supplier. - Demonstrate the ability to discuss the process of hospital transfusion/blood usage committee meetings.	
				Develop effective communication with all parties to ensure high-quality services and a patient safety culture.	Communicator
				- Contribute effectively to other interdisciplinary team activities. - Collaborate with other healthcare workers to ensure high-quality services and a patient safety culture.	Collaborator
				- Demonstrate an understanding of the role and relationship between regulatory body requirements and the blood bank management structure. - Demonstrate an understanding of the organizational structure of the blood bank, effective skills in dealing with blood bank employees, and familiarity with the current system of data coding, storage, and specimen requirements.	Leader



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Participate in promoting the health of patients as individuals and communities. • Develop and implement a personal continuing education strategy. • Apply the principles of critical appraisal to sources of blood bank information. • Contribute to the development of new knowledge through research. • Participate in rounds, conferences, and teaching sessions.	Health Advocate
				• Recognize own limitations and seek assistance when required. • Demonstrate a collegial manner at all times. • Recognize professional limits and seek advice and assistance from appropriate individuals in a timely manner. • Respond appropriately to criticism or feedback. • Demonstrate punctuality. • Demonstrate competence, integrity, and honesty. • Respect the confidentiality of information obtained in the course of professional duties.	Professional

Continuous Quality Management Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Blood Bank and Transfusion Laboratory	Senior	2	8 weeks	• Explain the different definitions of quality in quality systems. • Describe the importance of total quality management, quality elements, and factors affecting quality systems. • Describe the factors influencing the quality of blood bags for whole blood collection. • Demonstrate proficiency in maintaining the quality of blood components according to recommended standards from various agencies (Saudi FDA, CBAHI, AABB, CAP). • Describe the importance of a comprehensive transfusion laboratory safety policy and program. • Describe the role of quality assurance, quality management, and process improvement principles in blood bank operation and planning. • Describe the proper use of instrumentation and computerization in transfusion services.	Professional Expert



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Describe the elements of current good manufacturing practices as they apply to the collection, processing, and storage of all blood components/products. - Describe the principles and objectives of total quality management in transfusion services, including premises, personnel, instruments/reagents, biosafety, and external/internal quality control. - Recognize sources of pre-analytical variation and the role of biological variability in transfusion laboratory assessment. - Demonstrate the ability to prepare and present quality assurance and other types of reports to the Transfusion Committee and at other meetings, as requested. - Describe the proper use of instrumentation and computerization in a transfusion laboratory. - Demonstrate the elements of current good manufacturing practices as they apply to the collection, processing, and	

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				storage of all blood components/products. • Perform all steps of quality control for blood and blood components. • Perform all steps of quality control for blood bags, reagents, and diagnostic kits. • Prepare validation, calibration, installation, and maintenance plans. • Prepare for internal or external assessment plans. • Prepare a risk assessment plan. • Perform data collection and analysis of key performance indicators (KPIs). • Utilize different quality tools (e.g., flowchart, Pareto chart, run chart, fishbone diagram) for quality assessment and improvement.	
				• Demonstrate the use of various types of communication and practice when each is required (verbal, written, other).	Communicator
				• Participate in a multidisciplinary team of quality officers during quality improvement projects.	Collaborator



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				• Demonstrate a respectful attitude towards colleagues and members of a professional team. • Work with other professionals to prevent conflicts. • Acquire skills to establish a professional bond with team staff, collaborative professionals, learners, and the community. • Demonstrate the proper use of various types of communication (verbal, written, other). • Exhibit the need for effective, timely, clear, and accurate communication, recognizing the differing requirements of various agencies and professionals.	
				• Describe the principles of workload requirements and time management. • Demonstrate knowledge of laboratory safety for all personnel. • Describe the principles of laboratory information systems. • Describe the principles of quality assurance, quality control, and quality improvement.	Leader

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				Have knowledge of regulations pertaining to the safety and storage of chemicals.	
				- Describe and demonstrate the blood banker's role in providing accurate results through the application of quality regulations. - Describe and demonstrate the role of all necessary safety precautions when dealing with dangerous materials for laboratory officers and others, acting as a health advocate.	Health Advocate
				- Recognize the importance of scholarly contributions. - Recognize the importance of research and continuous medical education. - Demonstrate knowledge of basic quality principles. - Demonstrate the ability to objectively read quality control reports by attending dedicated courses and reading related books. - Recognize the importance of attending symposia, conferences, and lectures dedicated to quality programs.	Scholar



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				Attend courses related to laboratory safety programs on a regular basis.	
				- Recognize own limitations and seek assistance when required. - Demonstrate a collegial manner at all times. - Recognize professional limits and seek advice and assistance from appropriate individuals in a timely manner. - Respond appropriately to criticism or feedback. - Demonstrate punctuality. - Demonstrate competency, integrity, and honesty. - Respect the confidentiality of information obtained in the course of professional duties.	Professional

Research Project Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
Training Center	Senior	2	14 weeks	- Identify the basic principles of research ethics, design, methodology, data collection and analysis, and methods of research dissemination. - Formulate a clear, feasible, and clinically relevant research question using the PICO or a similar framework, ensuring it is reviewed and approved by the research supervisor. - Perform a literature review through a systematic search of major databases (e.g., PubMed, Scopus, Cochrane), extract key findings, and produce a literature summary. - Complete all required research ethics training and prepare an IRB-ready application draft for supervisor feedback and submission. - Conduct data collection for the selected research project and independently perform basic statistical analysis using appropriate software (e.g., SPSS, R, or Excel), producing results and preliminary interpretations.	Professional Expert



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Complete a research thesis according to the research guidelines approved by the program's scientific committee. - Prepare and present the research outcome during the research day. - Prepare a research abstract, poster, or manuscript for submission to appropriate national and international journals and conferences.	
				- Demonstrate skills in conveying and discussing scientific research with scientific communities through posters, abstracts, teaching slides, manuscripts, or other scientific communication modalities. - Communicate and collaborate effectively with research supervisors to conduct the research. - Communicate and collaborate effectively with healthcare professionals and institutions before and during the research project.	Communicator
				Identify, consult, and collaborate with appropriate experts, research institutions, and/or organizational bodies to facilitate the research.	Collaborator

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				- Identify an area of research interest and a research supervisor in order to engage in the scholarship of scientific inquiry and dissemination. - Utilize available resources and regularly meet with an identified research mentor. - Set realistic priorities and use time effectively to optimize professional performance. - Utilize healthcare resources cost-effectively.	Leader
				Recognize the contributions of scientific research in improving the health of patients and communities.	Health Advocate
				- Pose appropriate research questions, recognize and identify gaps in knowledge and expertise related to these questions, and formulate appropriate study designs to answer them. - Carry out the research as outlined in the proposal. - Collect and analyze data utilizing appropriate methods. - Prepare abstracts and manuscripts suitable for publication in peer-reviewed journals	Scholar



Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				and/or for presentation at international scientific meetings Identify research limitations and areas for further research.	
				- Recognize personal limitations and seek assistance when required. - Respond appropriately to criticism or feedback. - Demonstrate punctuality. - Demonstrate competency, integrity, and honesty. - Respect confidentiality regarding any information obtained during the research project. - Uphold ethical and professional expectations of research consistent with institutional review board guidelines, including meticulous data maintenance and ethical research conduct. - Demonstrate personal responsibility for setting research goals and working with a supervisor to set and achieve research timeline objectives. - Appropriately attribute authorship and contributions when publishing research.	Professional

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
				Disclose potential financial conflicts of interest (including speaker fees, consultative relationships, and so on) as appropriate when engaging in and disseminating research results.	

Elective Rotation

Rotation Setting	Training stage	Training years	Rotation duration	Rotation-specific objectives (SMART) (To describe the proposed outcomes in terms of KSA)	Competency roles
<i>Inside or outside the training center</i>	<i>Senior</i>	<i>2</i>	<i>8 weeks</i>	Based on the selected rotations from the D1 or D2 core rotations mentioned above.	As per the selected rotation from the D1 or D2 core rotations mentioned above.

TEACHING METHODS

The teaching process in postgraduate residency, fellowship, and diploma training programs is primarily based on the principles of adult learning theory. Trainees are expected to understand the importance of learning and actively participate in shaping the content and process of their education. Training programs incorporate the adult learning concept into every aspect of their activities, where residents are responsible for their own learning requirements. Formal training time includes the following three teaching activities:

1. Program-Specific Learning Activities
2. Universal Topics
3. General Learning Opportunities

Program-Specific Learning Activities:

Program-specific activities are educational endeavors specifically designed for trainees during their training. Attendance at these activities is mandatory, and non-compliance may lead to disciplinary action. It is advisable to link attendance and participation in these activities to formative assessment tools (see the formative assessment section below). Program administration should support these activities by providing protected time for trainees to attend and participate.

Program Academic Half-Day

Every week, at least 2-4 hours of formal training time (commonly referred to as *academic half-day*) should be reserved. Formal teaching time is a pre-planned activity with assigned tutor(s), time slots, and venue, excluding bench-side teaching, clinic postings, and so on. The academic half-day covers core specialty topics, which are determined and approved by the specialty's scientific



committee, and are aligned with specialty-defined competencies and teaching methods. These topics ensure that important clinical problems of the specialty are well taught.

It is recommended to conduct lectures in an interactive, case-based discussion format. The learning objectives of each core topic need to be clearly defined, and it is preferable to use pre-learning material. Whenever applicable, core specialty topics should include workshops and team-based learning (TBL) to develop skills in core procedures. Trainees should be actively involved in the development and delivery of topics under faculty supervision, which might include delivery, content development, or research. The trainee's supervisor should ensure that the discussion of each topic is stratified into three learning domains: knowledge, skill, and attitude, whenever applicable.

Annually, 40 academic half-day sessions should be conducted per academic training year, with reserved time for other teaching methods such as journal clubs and practical teaching. The program training committee, program directors, and chief residents, in coordination with academic and training affairs and regional supervisory committees, should work together to ensure the planning and implementation of academic activities as indicated in the curriculum. This should be done efficiently, utilizing available resources with optimal exchange of expertise. At the start of every academic year, the scientific committee will review, modify, and approve the contents of the academic half-day activities as required.

A structured **Academic Half-Day Program** is conducted **weekly** throughout the academic training year. Each session is **2 to 4 hours** of formal teaching time, planned in advance with assigned tutor(s), clearly defined learning objectives, scheduled time slots, and an approved venue or virtual platform. Formal teaching time refers to structured educational activities and excludes bench-side teaching, routine workplace supervision, clinical or laboratory service duties, and informal teaching during daily practice.

The academic half-day should cover core specialty topics determined and approved by the specialty's scientific committee. These topics should be aligned with program-defined competencies, rotation objectives, and approved teaching methods. The purpose of the academic half-day is to ensure that key theoretical, clinical, technical, and professional aspects of blood banking and transfusion medicine are delivered in a structured and consistent manner across the training program.

A total of **40 academic half-day sessions** should be conducted per academic training year (**80 to 160 academic hours/year**). These hours should be reserved specifically for formal academic activities, and trainees should be released from routine service duties during this time to allow full participation.

Academic half-day sessions should preferably be delivered using interactive and learner-centered teaching methods, including case-based discussions, journal clubs, practical teaching sessions, workshops, team-based learning, and other approved educational formats. Pre-learning materials should be provided whenever appropriate to support active participation and self-directed learning.

Trainees should be actively involved in the development and delivery of selected academic topics under faculty supervision. This involvement may include topic presentation, content development, literature review, case preparation, journal club facilitation, or research-related academic activities. The trainee's supervisor should ensure that each topic addresses the relevant learning domains, including **knowledge, skills, and professional attitudes**, whenever applicable.

The program training committee, program directors, and chief residents, in coordination with academic and training affairs and regional supervisory committees, should ensure proper planning, implementation, monitoring, and documentation of academic half-day activities. At the beginning of each academic year, the scientific committee should review, update, and approve the



academic half-day schedule to ensure alignment with curriculum objectives, program competencies, and formative assessment requirements.

Practice-Based Learning:

Training exposures during donor interaction, lab work, and other work-related activities—including courses and workshops (e.g., standardized donor/patient and bench teaching)—provide excellent learning opportunities. Trainees are expected to build their capacity through self-directed learning.

Practice-based learning allows trainers to supervise trainees, ensuring they become competent in the program's required practical skills. This approach fulfills knowledge, psychomotor, and/or attitude learning domains. Each trainee must maintain a logbook documenting procedures observed, performed under supervision, and performed independently. The minimum number of procedures required for training completion will be determined by a unified logbook, which the program's scientific committee will develop, approve, and distribute to all training centers at the start of each academic year.

Universal topics:

Universal topics are educational activities developed by the SCFHS for all specialties. Priority will be given to topics that are:

- High-value
- Interdisciplinary and integrated
- Require expertise that might be beyond the availability of the local clinical training sites

The SCFHS has developed universal topics, available as e-learning modules accessed via personalized accounts for each trainee. Each universal topic concludes with a self-assessment. As indicated in the "Executive Policies of Continuous Assessment and Annual Promotion," universal topics are mandatory components for trainees' annual promotion to the subsequent training level.

These topics are distributed throughout the entire training period (**see appendix C for universal topics**).

General Learning Opportunities:

Formal training should be supplemented by other practice-based learning (PBL) activities, such as:

- Journal clubs
- Involvement in quality improvement processes and projects
- Continuous professional development (CPD) activities relevant to the specialty (e.g., conferences and workshops)
- Attending relevant committee meetings (e.g., hospital transfusion and quality committees)
- Participating in public events relevant to the training program (e.g., national and international health days)

ASSESSMENT AND EVALUATION

Purpose of Assessment

Assessment plays a vital role in the success of postgraduate training. It guides trainees and trainers in achieving defined standards, learning outcomes, and competencies. Additionally, assessment provides feedback to learners and faculty regarding curriculum development and implementation, teaching methods, and the quality of the learning environment. Reliable and valid assessment is essential to ensure curriculum alignment with its objectives, learning methods, and assessment tools. Ultimately, assessment assures patients and the public that health professionals are safe and competent to practice.

Assessment can serve the following purposes:

- **Assessment for learning:** Trainers use information from trainees' performance to inform their learning for improvement. This enables educators to use information about trainees' knowledge, understanding, and skills to provide feedback on learning and how to improve.
- **Assessment as learning:** This involves trainees in the learning process, enabling them to monitor their own progress. Trainees use self-assessment and educators' feedback to reflect on their progression. It develops and supports trainees' metacognitive skills and is crucial in helping residents/fellows become lifelong learners.

- **Assessment of learning:** This is used to demonstrate the achievement of trainees' learning. This graded assessment usually counts towards the trainees' end-of-training degree.
- **Feedback and evaluation:** As assessment outcomes, these represent quality metrics that can improve the learning experience.

For organizational purposes, assessment will be further classified into two main categories: *Formative* and *Summative*.

Formative Assessment

General Principles

Formative assessment should be integrated into the curriculum design, grounded in best practices and evidence-based approaches, aligned with the stated competencies, and utilize appropriate tools.

Purpose of Formative Assessment:

Formative assessment aims to actively support trainees' growth by guiding learning, verifying progression, and ensuring they acquire the competencies essential for high-quality professional practice across all health disciplines. The specific objectives of formative assessment are:

- Enhance learning by offering trainees opportunities to practice, receive immediate feedback, measure their performance, and identify areas for further development and improvement.
- Drive learning and optimize the training process by clarifying expectations for trainees and motivating them to actively pursue suitable training and experiences.
- Provide robust, comprehensive evidence that trainees are progressing toward meeting curriculum standards throughout the training program.

- Ensure trainees are acquiring the required competencies across all domains of good healthcare practice.
- Verify that trainees possess the essential foundational knowledge, skills, and professional attitudes needed for their specialty.
- Confirm that trainees are advancing appropriately in their performance relative to their stage of training.

Trainees, as adult learners, should actively seek out feedback and use it to develop their performance throughout their journey from "novice" to "mastery" levels of competence. Formative assessment (also referred to as continuous or ongoing assessment) is a component of assessment deliberately distributed across the academic year, aiming primarily to provide trainees with timely, meaningful, and actionable feedback that drives learning and improvement.

A specified time should be allocated for trainees to meet with their program director or equivalent to review performance reports and logs (e.g., ITER, logbook, workplace-based assessment tools, and so on). Trainees are expected to take ownership of their development through self-directed learning. Input from the overall formative assessment tools will be integrated at the end of the year to inform decisions on whether individual trainees advance to the next level of training. The formative assessment instruments will be periodically reviewed and updated as needed, ensuring alignment with SCFHS guidelines and standards.

In line with best practices in health professions education, formative assessment will have the following features, tailored to the targeted competencies:

- a. Multisource: Select all appropriate tools, including relevant workplace-based assessments, according to competency, training level, and rotation.

- b. Comprehensive: Cover all learning domains (i.e., knowledge, skills, and attitude (professional behavior)).
- c. Relevant: Focus on workplace-based observations for performance in authentic practice settings.
- d. Competency milestone-oriented: Reflecting the trainee's expected competencies that match their developmental level.

Formative Assessment Tools

The following formative assessment tools (Table 1) are currently approved for trainees' assessment during the training program. The description of each tool is shown in Table 2.

Promotion Examination

This is a written exam that permits the trainee to be promoted from the "D1" to "D2" level of training. For further details on the promotion examination, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org). An example of the exam Blueprint Outlines is shown in Table 3, which demonstrates the contents and weight of an exam and is included here for demonstration only. The trainee MUST refer to the most up-to-date version published on the SCFHS website.



Table 1: Formative Assessment Tools

Gen./Sub	Level	Knowledge					Skills							Attitude
		SOE	EYPT-n't	Academic Activities	CBD	EYPT-Local	OSCE/OSPE	Research	DOPS	Logbook	Volunteering	Other	Mini-CEX	Evaluation-ITERS
BLOOD BANKING and TRANSFUSION	D1			✓		✓		✓		✓			✓	✓
	D2			✓				✓		✓			✓	✓

SOE: Structured Oral Exam skills.

CBD: Case-Based Discussion.

DOPS: Direct observation of the procedure.

Mini-CEX: Mini-Clinical Evaluation Exercise.

EYPT-Local: promotion exam or progress test.

EYPT-n't: international examinations.

OSCE: Objective Structured Clinical Examination

Table 2: Description of Formative Assessment Tools

Learning Domains	Assessment Tool	Requirements
Knowledge	Academic Activities	Academic Activities for D1 & D2: Trainees must attend all scheduled academic activities. Any excused absence must be approved by the program director.
	EYPT- Local	For D1: Trainees are required to take a written progress test consisting of a minimum of 100 MCQs. Numerical scores will be translated into SCFHS categories.
Skills	Research	D1: Trainees are required to complete the SCFHS E-modules (research module) or equivalent and provide proof of completion or a certificate for promotion. D2: Trainees are required to submit at least one research proposal AND an abstract with preliminary results to complete their training.
	logbook	D1-D2: Trainees are required to fulfill all logbook requirements according to their training levels.
	Mini-CEX	D1-D2: Trainees are required to complete at least 6 Mini-CEX per academic year, preferably once every quarter. Results are for formative feedback purposes only and are not used for pass/fail purposes. Mini-CEX cases will be counted from the logbook cases, and results are used for formative feedback purposes and not for pass/fail marking.



Learning Domains	Assessment Tool	Requirements
Attitude	ITER	D1-D2: All ITERs must be completed. ITERs are used for end-of-rotation evaluations, following SCFHS policies and criteria for ITERs.

Important Notes:

All formative and work-based assessments ("WBA") should be performed following SCFHS definitions and methodologies.

Failure to comply with these requirements will subject trainees to disciplinary actions according to SCFHS bylaws.

Table 3: Promotion Exam Blueprint Outlines

No.	Section	Proportion%
1	Blood Donor Management	20
2	Apheresis Procedures	10
3	Blood Components	20
4	Transfusion-Transmitted Diseases (TTD)	20
5	Immunohematology	30
Total		100%

Summative Assessment

General Principles

Summative assessment is designed primarily to inform decisions regarding a trainee's competency. Unlike formative assessment, its purpose is not to provide constructive feedback. For further details, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org). Trainees will receive a "Certification of Training Completion" upon successfully completing all training rotations, making them eligible to sit for the final exams.

Final In-training Evaluation Report (FITER)

In addition to the training program committee's approval of practical requirements (trainee's logbook), program directors prepare a FITER for each resident at the end of their final year of training. This report serves as the basis for obtaining the Certificate of Training Program Completion and qualifying for the Final Specialty Exams.

Certification of Training Completion

To be eligible for final specialty examinations, each trainee must obtain a "Certification of Training Completion." Based on the General Bylaws of Training in Postgraduate Programs and executive policy (please refer to www.scfhs.org), trainees will be granted this certification once the following criteria are fulfilled:

- Successful completion of all training rotations.
- Completion of training requirements (e.g., logbook, research, others) as outlined in the FITER and approved by the scientific council/committee of the specialty.
- Clearance from SCFHS Training Affairs, ensuring compliance with tuition payments and completion of universal topics.



- Passing the first part examination (where applicable).

The "Certification of Training Completion" will be issued and approved by the supervisory committee or its equivalent, in accordance with SCFHS policies.

Final Specialty Examinations

The final specialty examination is the summative assessment component that grants trainees specialty certification. It consists of two elements:

1. **Final Written Exam:** To be eligible for this exam, trainees must have obtained a "Certification of Training Completion." The examination is conducted in a multiple-choice question (MCQ) format.
2. **Final Clinical/Practical Exam (SOE):** Trainees must pass the final written exam to be eligible to sit for the final clinical/practical exam.

Blueprint outlines for the final written and clinical/practical exams are shown in Tables 4 and 5. These tables demonstrate the content and weighting of the exam components and are included here for demonstration only. Trainees MUST refer to the most up-to-date version published on the SCFHS website. For further details on final exams, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org).

Table 4: Example of Final Written Exam Blueprint

No.	Sections	Percentage
1	Blood Donor Management	13%
2	Apheresis Procedures	12%
3	Blood Components	15%
4	Transfusion-Transmitted Diseases (TTD)	10%
5	Immunohematology	25%
6	Special Transfusion Preparation and Practices	10%
7	Organization and Management of Transfusion Services	10%
8	Continuous Quality Management	5%
Total		100%



Table 5: Example of Final Clinical Practical Exam Blueprint

		DIMENSIONS OF CARE				
		Health Promotion & Illness Prevention 1±1 Station(s)	Acute 5±1 Station(s)	Chronic 3±1 Station(s)	Psychological Aspects 1±1 Station(s)	# Station(s)
DOMAINS FOR INTEGRATED CLINICAL ENCOUNTER	Patient Care 7±1 Station(s)	1	4	2		7
	Patient Safety & Procedural Skills 1±1 Station(s)		1			1
	Communication & Interpersonal Skills 2±1 Station(s)			1	1	2
	Professional Behaviors 0±1 Station(s)					0
	Total Stations	1	5	3	1	10

PROGRAM AND COURSE EVALUATION

The SCFHS applies various measures to evaluate the implementation of this curriculum. The training outcomes of this program follow the quality assurance framework endorsed by the Central Training Committee of the SCFHS. Trainee assessment (both formative and summative) results are analyzed and mapped to the curriculum content. Other indicators that will be incorporated are as follows:

- Reports of the annual trainee satisfaction survey.
- Reports from trainees' evaluation of faculty members.
- Reports from trainees' evaluation of rotations.
- Reports from the annual survey of program directors.
- Data available from program accreditations.
- Reports from direct field communications with trainees and trainers.

Goal-Based Evaluation: The achievement of intended milestones will be evaluated at the end of each stage to assess the progress of curriculum delivery. Any deficiencies will be addressed in the following stage using the time allotted for trainee-selected topics and professional sessions.

In addition to subject-matter opinions and best practices from benchmarked international programs, the SCFHS will apply a robust method to ensure that this curriculum utilizes all available data when it is revised in the future.



POLICIES AND PROCEDURES

This curriculum represents the means and materials, and outlines the learning objectives, with which trainees and trainers will interact to achieve the identified educational outcomes. The SCFHS has a full set of "General Bylaws of Training in Postgraduate Programs" and "Executive Policies" (published on the official SCFHS website) that regulate all training-related processes. Examples of regulations that need to be implemented include the general bylaws of training, assessment, and accreditation, as well as executive policies on admission, registration, formative assessment and promotion, examination, trainees' representation and support, duty hours, and leave. Under this curriculum, trainees, trainers, and supervisors must comply with the most up-to-date bylaws and policies, which can be accessed online via the official SCFHS website.

APPENDICES

- A. Recommended Lecture Topics
- B. Recommended Journals and Organization Links
- C. Universal Topics
- D. Suggested Reading Resources



A- Recommended Lecture Topics

Rotation	Recommended lectures
Blood Donor Management	• Donor registration (manual and electronic systems) • Communication skills and brainstorming • Donation types: voluntary donation, family replacement, directed donation, and autologous donation • Criteria for donor selection (DHQ questionnaire): medical history, examination, and informed consent • Education, awareness, and information about prospective donors • Pre-donation and post-donation laboratory tests • Donor recruitment and recall: policy, methodology, and documentation • Use of donor information technology for donor recruitment • Donor information programs for campaigns • Autologous blood donation: definition, types, and clinical applications • Blood donor programs • Motivating factors for donation • Types of blood bags, anticoagulants, and preservative solutions • Phlebotomy procedure and sample collection • Care of blood donors: pre-donation, mid-donation, and post-donation • Donor reactions and their management

Rotation	Recommended lectures
Apheresis Procedures	• Principles of apheresis technology • Various equipment and disposables • Whole blood donation versus apheresis donation • Advantages of automated blood collection • Donor criteria and selection • Platelet apheresis • Other component collection: leukapheresis, plateletpheresis, plasmapheresis, erythrocytapheresis, and granulocytes • Peripheral blood stem cell collection • Stem cell indications, processing, and storage • Types of therapeutic apheresis: indications and procedures • Technical principles of therapeutic apheresis: anticoagulation, timing of procedures, replacement fluids, and venous access • Recognition and management of adverse events • Plasma exchange • Red cell exchange • Leukoreduction • LDL apheresis (Liposorber) • Pediatric considerations for therapeutic apheresis
Blood Components	• Main constituents and functions of circulating blood: • Hematopoiesis • Red cells (formation, function, lifespan, and destruction) • White cells (formation, function, lifespan, and destruction) • Platelets (formation, function, lifespan, and destruction) • Plasma (formation, function, lifespan, and destruction)



Rotation	Recommended lectures
	• Types of blood bag systems • Types of anticoagulant and preservative solutions • Principles of component processing and preparation • Steps in blood component and blood derivative preparation • Quality monitoring for blood components • Proper labeling of various components: i.e., PRBC, FFP, PLTC, CRYO, CPP, granulocytes, and so on. • Storage of blood and blood components: i.e., PRBC, FFP, PLTC, CRYO, CPP, granulocytes, and so on. • Transportation and shipping of blood and blood components • Proper cold chain • Storage lesions
Immunohematology	• Principles of basic immunology: antigen, antibody, complement, immunoglobulin • Antigen-antibody reactions • Lymphocytes in humoral and cellular immunity • Principles of basic genetics • Basic genetics of blood groups: • Principles of blood group inheritance • ABO blood group system • Rh blood group system • Other blood groups • High and low frequency antigens • Sample, patient, and component identification requirements • Detection of antigen–antibody reactions (AHG test and other methods)

Rotation	Recommended lectures
	• Antibody screening techniques • Antibody identification methods • Crossmatching, typing, and screening of minor, major, and direct antiglobulin tests • Advanced and enhancement techniques • Interpretation of antibody screening and crossmatching • Platelet and granulocyte antigens and antibodies • Alloimmunization to human platelet antigens and its prevention • HLA system, function, genes, antigens, antibodies • Introduction to platelet crossmatching
Transfusion- Transmitted Infections	• Blood safety • Transfusion-transmitted infections • Bacterial: Current risk and prevention strategies • Viral: Current risk and prevention strategies • Parasitic: Current risk and prevention strategies • Prions: Current risk and prevention strategies • Screening assays: • Enzyme-linked immunosorbent assays (ELISA): • Antiglobulin EIA • Competitive • Sandwich • Antibody capture • Combination Ag/Ab assays • Microparticle assays • Chemiluminescence assays



Rotation	Recommended lectures
	• Particle agglutination assays • Simple rapid assays • Nucleic acid amplification techniques (NAT): • Polymerase Chain Reaction (PCR). • Transcription-Mediated Amplification (TMA) • Confirmatory testing: • Western blot • Neutralization • RIBA test • TPHA • Thick and thin films for malaria • Selecting screening assay: • Sensitivity • Specificity • Evaluation and validation of assay • Pathogen Inactivation • All technologies, with a focus on those available for use in blood banks • Bacterial testing
Special Transfusion Preparation and Practice	• Blood and blood components: Indications, dosage, and administration • Plasma fractionation and derivatives for transfusion • Principles, preparation, handling, and indications of special (modified) blood components for transfusion (e.g., thawing, pooling, washing, and irradiation)

Rotation	Recommended lectures
	• Principles, preparation, handling, and indications of red cell freezing • Blood component issue and handling for transfusion • Blood transfusion administration • Autoimmune hemolytic anemia • Hemostasis and coagulation • Hemovigilance • Recognition and management of transfusion adverse reactions • Massive hemorrhage and massive transfusion protocol • Disseminated Intravascular Coagulation (DIC) • Maximal surgical blood order schedule • Patient blood management • Blood substitutes and hemopoietic agents: • Hemopoietic growth factors • Management of transfusion in special patient populations • Fetal (intrauterine) transfusion • Neonatal transfusion (simple transfusion and exchange transfusion) • Sickle cell disease (simple transfusion and exchange transfusion) and hyperhemolysis • Malignancies and stem cell transplantation
Organization And Management of Transfusion Services	• Organization and function of blood services and hospital transfusion • Development of transfusion services • Organizational structure and role of the manager • Job descriptions, responsibilities, and delegation



Rotation	Recommended lectures
	• Estimation of blood needs, setting goals, and operation plans • Statistics and daily report systems • Inventory control and stock management • Disaster and business continuity plans • Staff planning, monitoring, and evaluation • Ethical and legal considerations pertaining to transfusion practice • Interpersonal and communication skills • Donor notification and counseling • Look-back and trace-back (TTD investigation) procedures • Organisation and management of Hospital Transfusion Committee • Development of policies and standard operating procedures • Development and control of forms, labels, and records • Selection of indicators to assess performance
Continuous Quality Management	• Quality Awareness: • Quality terms and definitions • Quality management systems • Quality system essentials (QSEs) • Quality tools • Importance of quality • Factors affecting quality • Safety regulations: • Introduction to hygiene and safety • The safety manual/plan

Rotation	Recommended lectures
	• Hand washing • Work design and exposure prevention • Using personal protective equipment • Handling of biohazardous material • Waste management and waste reduction • Safety and minimizing risks • Personnel and customer care • Documentation: • Documentation in quality systems • Document control • Storage duration of different documents • Assessment within quality systems: • Validation • Error management • Audit and auditing • Audit process • Accreditation and the role of regulatory agencies: • CBAHI • SFDA • AABB • CAP • Instruments and equipment used in blood banks: • Types and principles • Validation, calibration, installation, and maintenance plans • Supplier and customer issues:



Rotation	Recommended lectures
	• Quality of the product provided • Delivery performance • Service and maintenance provided • Deviations and nonconformance • Internal and external assessment • Continuous quality improvement • Quality control of blood and blood components • Quality control of reagents and diagnostic kits • Good manufacturing practices (GMP) • Proficiency testing • Principles of hemovigilance

B- Website Links for Recommended Journals, Regulatory, and Scientific Organizations

Journal	Website link
Transfusion	https://onlinelibrary.wiley.com/journal/15372995
Blood	https://ashpublications.org/blood
Vox Sanguinis	https://onlinelibrary.wiley.com/journal/14230410
Transfusion Medicine	https://onlinelibrary.wiley.com/journal/13653148
Asian Journal of Transfusion Science	https://journals.lww.com/ajts/pages/default.aspx
Regulatory Body	Website link
Ministry of Health (MOH)	https://www.moh.gov.sa/en/Pages/default.aspx
Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI)	https://portal.cbahi.gov.sa/en/
Saudi Food and Drugs Authority (SFDA)	https://www.sfda.gov.sa/en
Scientific organization	Website link
International Society of Blood Transfusion (ISBT)	https://www.isbtweb.org/
Association for the Advancement of Blood & Biotherapies (AABB)	https://www.aabb.org/home
Serious Hazards of Transfusion (SHOT)	https://www.shotuk.org/
National Blood Authority Australian	https://www.blood.gov.au/



C- Universal Topics

Intent:

These high-value, interdisciplinary topics are of utmost importance to trainees. Delivering them centrally ensures that every trainee receives high-quality instruction and develops essential core knowledge applicable across all specialties.

The topics included here meet one or more of the following criteria:

- Impactful: Topics that are common or life-threatening.
- Interdisciplinary: Topics that are difficult to learn from a single discipline.
- Orphan: Topics that are poorly represented in the undergraduate curriculum.
- Practical: Topics that trainees will likely encounter in hospital practice.

Development and Delivery:

The commission will centrally develop and deliver core postgraduate curriculum topics via an e-learning platform. Preliminary learning outcomes will be established for each topic and may be modified by content experts in collaboration with the central team.

These topics will be didactic, focusing on practical aspects of care, and will be more content-heavy than workshops and other face-to-face interactive sessions. The suggested duration for each topic is 1.5 hours.

Assessment:

Topics will be delivered modularly, with an online formative assessment at the end of each learning unit. Upon completing all topics, a combined summative assessment will be administered in the form of context-rich multiple-choice questions. All trainees must achieve minimum competency in this summative assessment. Alternatively, these topics can be summatively assessed as part of a specialty examination.



Universal topics list

Training year	Models		Topics	
	Number	Name	Number	Name
D1	1	Introduction	2	Hospital-acquired infections
			3	Sepsis, SIRS, and DIVC
			4	Antibiotic stewardship
			5	Blood transfusion
	2	Cancer	6	Principles of cancer management
			7	Side effects of chemotherapy and radiation therapy
			9	Cancer prevention
	3	Diabetes and Metabolic Disorders	11	Recognition and management of diabetic emergencies
			12	Management of diabetic complications
			13	Comorbidities of obesity
D2	4	Medical and Surgical Emergencies	16	Management of acute breathlessness
			18	Management of hypotension and hypertension
	5	Acute Care	21	Pre-operative assessment
			25	Management of fluid in the hospitalized patient

Training year	Models		Topics	
	Number	Name	Number	Name
			26	Management of electrolyte imbalances
	7	Ethics and Healthcare	31	Occupational hazards of HCW
			32	Evidence-based approach to smoking cessation
			33	Patient advocacy
			34	Ethical issues: transplantation/organ harvesting; withdrawal of care
			35	Ethical issues: treatment refusal; patient autonomy



D- Suggested Reading Resources*

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*It is recommended to use the latest version of the resource or as recommended by the program scientific committee

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